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Objectives of Wood Utilization Research at the Ohio Agricultural Experiment Station and What This Research May Mean for Ohio Forest Lands.*

by

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What is the problem concerning the utilization of Ohio woods? Why the necessity for research in wood technology and what may be the benefits of such research? First it is necessary to define the problem, second, to propose solutions to this problem, and third, to determine whether these solutions will improve Ohio forestry.

Ohio, historically, has been a secondary producer of timber. In the migration of the lumber industry across this nation, Ohio has been included in the fringes of the great centers of lumber production. When the center of lumber production was in Pennsylvania in the 1860's and in Michigan in the 1890's Ohio produced quantities of quality lumber for the expanding west. The deterioration of her forests is a historical fact. These forests were subjected to overcutting and a policy of "cut the best and leave the rest". Today Ohio's forests are returning, but to hasten this return it is necessary to promote good forestry. To do this it becomes mandatory, unfortunately, to make cultural practices economically feasible. Thus a means of selling poor form trees or trees of a discriminated species provides an incentive to the landowner to upgrade his forests. There has always been a market for quality timber and undoubtedly there always will be.

Hutchinson's (1) survey of Ohio timber includes the history of Ohio woodlands. Ohio is not unique; the other cornbelt states are similarly affected. Ohio has five million acres of timber land; less than half are classified as sawtimber stands. Sixty percent of these stands are in the glaciated region where stands are located in scattered farm woodlands. Farm woodlots comprise 57 percent of the forested area. Another 38 percent is in industrial or other private ownership. Thus much of the utilization of timber is for farm use. Such products as posts, poles, lumber and fuelwood can be produced for farm consumption. Hutchinson makes this statement: "Currently, only a few farm woodland owners are using their forest land to good advantage." Thus the problem resolves itself into one which is not only concerned with uses for wood, but also into one which implies education and marketing.

Beside the decline of Ohio forests and their division into small units, there are other factors which influence the utility of wood. The loss of markets for wood products has been one such factor. Why this decline in the use per capita of wood? The National Lumber Manufacturer's Association has started an advertising

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campaign to simply present the facts concerning wood to the public. Unfortunately, wood has been around too long, it is now new, it doesn't require specific skills to use it, nor does it perform adequately in some cases for which it is used. When it is improperly used or poorly maintained, the consumer tends to find fault with the wood, rather than the use or maintenance. I wonder how many steel fence posts have been sold to consumers who initially placed a non-durable or untreated post in the ground. Such a thing as protecting wood in contact with the ground should be a universal practice.

Why Have Markets for Wood Been Lost?

In the National Lumber Manufacturer's Association's survey of reasons for markets being lost (2), four factors stood out: First, wood has been out-promoted by its competition. How many advertisements of competitors have you heard which state a certain product doesn't rot, shrink, or swell? These advertisers have set wood up as a standard.

Second, the consumer has lost faith or contact with wood because of his lack of information about wood. How many consumers know that the materials for home construction can be pressure treated to protect them from rot for less than 10 percent of the cost of the lumber? How many buy lumber by grade? Do they buy lower quality, tight knot boards for paintable items?

Third, the success of discriminatory building codes, fire insurance ratings, and other miscellaneous legislation is restricting the use of wood. Could you build a home in your town using post and beam or 2" x 3" stud wall construction? Does heavy timber construction have a favorable fire rating? Many a building has been a total loss because steel members failed to support their own weight in a fire in which a timber would have merely charred.

Fourth, the consumer rejection of wood because of the lack of a standardized quality product. Since wood is a natural product, variability of wooden members is inevitable. This variability is taken into account in the determination of working stresses of wooden structural members. The imitators of wood's variability are numerous. "Wood grain" table tops, cabinet fronts and other decorative items are numerous. Here competitors have gone to wood to produce a salable product. You can buy lumber by grade. These grades establish the minimum defects permissable, thus most boards of a grade are better than the defined standard.

Some of the above facts are probably known to you, others may not be, thus the National Lumber Manufacturer's Association has started this advertising campaign to acquaint the public with wood, a material that has been our heritage. The problem is not one of Ohio's alone, but is one concerning the wood industry of the nation. In Ohio however, we can supply through research some of the information necessary to promote the intelligent use of wood, thus creating an expanded market and an increase in good forestry.

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(1) Hutchinson, K. O. and J. T. Morgan (1956). Ohio's Forests and Wood-using Industries. Forest Survey Release 19, Central States Forest Experiment Station, Columbus, Ohio.

(2) Lloyd, W. B. 1958. The Year of Cecision for Wood Merchandising. Forest Products Journal, Vol. IX, No. 2.

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Objectives of the Woods Products Research to be Conducted at the Ohio Agricultural Experiment Station:

Broadly, they can be listed as -

(1) To find increased use for Ohio-grown wood.
(2) To develop uses for so-called low value species.
(3) To conduct basic research on the properties of wood.
(4) To modify wood so as to minimize or eliminate its disadvantages.

This as presented, is a very broad program and one which will take years to develop. With the facilities being established at Wooster we hope to begin to add to the knowledge of wood through research in species found in Ohio. We do not intend to develop a laboratory like the Forest Products Laboratory at Madison, but rather to supplement it with specific problems concerning local material.

This problem of research with a material that is the raw material for such a large industry can be frustrating. Ohio has 54 paper mills (3), but only four pulp mills. Thus Ohio ranks fourth in the number of paper mills. Therefore most of the pulp is imported. We are aware that Ohio has good pulping species, but they are either in scattered tracts or water is not available close to concentrated areas of pulp size material. The paper industry is therefore supplying employment to Ohioians, but not using Ohio grown material. The developments in pulping hardwoods have opened up the use of a wide range of species. But the pulp industry requires straight rot free sticks, to produce its product. Poor form rotten sticks require longer barking time and absorb excessive amounts of cooking liquors. Before such an industry can be established it requires raw materials in large enough quantities and sufficient quality to be economically feasible. Intensive forestry may provide such a raw material, but it must be done before the industry will be attracted to Ohio. The utilization of Ohio grown material is therefore dependent on good forestry and visa versa.

What type of research in wood technology can benefit forestry and Ohio woodlands, consequently supplying the wood-using industries of Ohio with better raw material? The research may be divided into two categories - basic or fundamental research and applied research.

Basic Research

The basic research primarily will be essentially in two fields, namely, the chemical properties of wood and the physical properties of wood. We are conducting a project at the present time associated with the natural durability of wood. Extractives from six native species are being tested as to their fungicidal properties. This is fairly basic research which may provide us with answers as to the physiology of natural durability. Such a project has applied aspects which are in the realm of the future protection of living trees from decay organisms, although this is an improbable immediate result of such research.

We know that wood is a hydrocarbon and when we examine the huge chemical industries based on coal and oil, other hydrocarbons, as the raw materials we can imagine a wood chemical industry of the future. Research is being conducted

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(3) - 1957 Posts Paper Mill Directory, L. D. Post, Inc., New York City, New York.

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in all phases of wood chemistry at many institutions and private companies. We are also interested in the chemical properties of wood and hope to do work along such lines as destructive distillation and wood hydrolysis in the future. Here we will be working with the forest tree improvement and forest tree physiology specialists to determine the effects of genotype and mineral nutrition on the chemical properties of wood.

Integration of research talents will also be supplied in physical properties research. We are working on the changes in specific gravity correlated with certain mineral nutrition studies, and hope to work with the geneticist on the genotypic variations within a species in such physical properties as specific gravity, fiber length, spiral grain, and dimensional changes due to moisture. The objective in such research is to define quality of wood produced by response to genetic or physiologic processes.

Applied Research

The applied research is aimed at answers to the immediate problem. The Ohio Station has been working with fence post research for fifty years. This research will continue on a reduced scale. The Forest Products Laboratory has been working with a process called Double Diffusion. Essentially two water soluble salts are absorbed by the green post and precipitate an insoluble salt which is a fungicide. Most of their work has been with southern species; our work will include Ohio woods in an attempt to provide means of utilizing small locally-grown trees.

Since much of the lumber produced on the farm is used in building or maintaining farm structures, we are going to do some work in this field. We plan to do research into the dipping of green lumber from the saw with hopes of providing protection from stain and mold fungi. Material handled in this manner will be less susceptible to deterioration and provide cleaner lumber for farm use and resale.

Most of the timber cutting of farm woodlots is done in the winter. The lumber is stacked during this time and probably is not used until the following fall. The lumber which is to be sold is stacked, usually in poorly-formed, unroofed piles to be handled when the price is right. Small sawmills handling relatively low quantities of timber are forced to build up inventories of lumber before sale due to the increased cost of hauling small amounts. In such cases the lumber dries unevenly and much material is lost because of drying defects. We are proposing a study to predry the lumber artificially, using a crop drier. The objectives of such a study will be to hasten drying so as to minimize the time which the lumber is susceptible to fungi and also to control the rate of drying to reduce the amount of surface checking.

Many of the poorly formed trees in Ohio woodlots are large trees which have been passed over because of their form. These trees take nutrients, light, water, and space from the surrounding trees. They are essentially parasites in a woodlot, yet they have sections which are straight or defect-free. Such trees can be used if a means of converting them to lumber and drying such lumber can be found. The market for this material could be found in the furniture industry. What lengths of wood does such an industry require? Look around at the furniture here or in your home. Most pieces are less than 30 inches long. Bed rails are about the longest required. Research in the economical handling of dimension stock from tree to factory can provide means of utilizing the wood from many woodlots. Initally we hope to do research in sawing and drying such lumber.

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There are many other types of research and phases of utilization than those outlined above. We recognize this and hope to be able to expand the research to other fields of utilization in the future. We feel research in utilization will provide means of practicing better forestry through increased utilization of our trees. If through our research we can provide the incentive to upgrade our woods by ridding them of undesirable species and poor formed trees, we feel there will be increased interest by the forest industries in Ohio forests, and Ohio will return to its former place as a state which provides the wood industries with quality raw material.

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